PATENT SPECIFICATION

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COMPLETE SPECIFICATION.

Improvements in or relating to Rolls for Use in Feeding or Folding Paper in Folding Machines.

We, CAMCO (MACHINERY) LIMITED, of Camco House, 63, Farringdon Street, London, E.C.4, a British Company, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to improvements in the manufacture of rolls for use in folding machines and has it greatest utility in connection with rolls working in pairs, where the paper is fed or folded and fed between the rolls of a pair.

Rolls of various kinds have been employed for the purpose heretofore with varying degrees of success and for the use more particularly in folding machines it has also been proposed to make one of every two engaging rolls with a periphery of felt, rubber or other yielding substance in the place of the customary metal roll having a roughened or fluted surface. Leather or compressed pasteboard and generally frictional materials as a covering for rollers have likewise already been proposed. Now in buckle folding machines it is particularly important and advantageous to employ felt as a covering for what is known as the pull-out roll by which is meant the roll which first comes into play, as regards any given sheet of paper, after the paper begins to buckle especially if the sheets which are used for printing are paraffin-sprayed as is now frequently the case.

The object of the present invention is to provide a roll having a feeding or folding surface of an appropriate felted fabric which may be readily replaced at small expense and to which powder and loose fibres will not too readily cling to the extent of interfering materially with its paper gripping qualities. This surface material is mounted on an unyielding core member with or without the interposition of an intermediate layer and in the latter case and preferably in both cases is applied in the form of a strip wound helically on the core.

Embodiments of the invention are illustrated by way of example in the accompanying drawing, in which:

Fig. 1 is a fragmental plan view of a portion of a folding machine of the buckle-fold type in which rolls according to this invention are employed.

Fig. 2 is a vertical, longitudinal section of the same taken substantially on the line 2—2 of Fig. 1.

Fig. 3 is a detail view of a roll embodying the invention parts of the roll cover being removed to more clearly illustrate the same, and

Fig. 4 is a transverse sectional view, somewhat diagrammatic in character, through a fold unit of the knife-fold type, embodying this invention.

In the fragmental view of Figs. 1 and 2 is shown a feed table comprising the well known feed rolls 10 of conventional tubular steel construction. These feed rolls could however be covered rolls according to the present invention if desired. This feed table is designed to deliver paper sheets to a separate pair of feed rolls 11, which are positively driven by any suitable power connections. Sheets passing through the rolls 11 are fed between spaced guide plates 12 and 13 (omitted from Fig. 1 for the sake of clearness) and into the rolls 14 and 15 of a fold section. This section comprises also rolls 16 and 17 and fold plates 18 and 19, the rolls and plates of the section being arranged in the conventional way and operating in a manner well known in the art. A sheet of paper travelling through the section may be buckled between rolls 15 and 16 and again between rolls 16 and 17, or between one such pair only, as the nature of the work demands, but in any event each sheet must travel between rolls at three different points in the fold section. The pull-out roll for plate 18 is the roll 15 while for plate 19 it is the roll 17. In a three-fold section the pull-out rolls are the third, fourth and fifth rolls of the series. If these rolls are made in accordance with the present invention the advantages they afford in the feeding of paraffin sprayed paper will be realised regardless of the character of the other rolls in the machine. The rolls 11, 14, 15, 16 and

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17 are all shown to be constructed in accordance with the present invention.

Referring now to Fig. 3, a roll is shown having a hard or relatively hard core 20 which is formed preferably of solid metal, although it may be hollow or may be constructed of other relatively unyielding materials possessing sufficient strength for the purpose. This core is provided with a yieldable surface layer of felted fabric. Felt has a particular and highly important advantage, namely that it maintains its texture after wear, whereas in the case of woven and knitted fabrics threads become broken after considerable wear and thereafter the material tends to disintegrate rapidly. The breaking of threads may even occur in the surfacing of the material before the roll is put into use. It is essential therefore that the fabric used is one whose constituents are not spun or woven but are associated by what is generally known as a felting process.

In carrying out the invention the outer covering may be applied to the core in various ways. It may be manufactured for instance in tubular form, the tubes being drawn onto the core from one end, with the interposition of a layer of fibrous material such as paper, such a construction being indicated in Fig. 4. However it is preferable to cut the felt in strips and wind it upon the roll spirally, as indicated in Fig. 3, cementing it down securely. It is advantageous, although perhaps not essential, when employing the spirally wound strips illustrated in Fig. 3, to first glue a strip of heavy paper or like fibrous material to the metal. This paper strip is dampened before it is applied, and in drying it is shrunk tightly to the iron core. The felt strip is then wound upon the paper strip in a reverse spiral, so that the turns of one strip cross those of the other. The felt strip may be very securely glued or cemented to the paper strip, and the two strips reinforce and strengthen each other, forming together a composite tube which is tightly fitted to the core. On this account the character of the union between the paper and core becomes less important, as relative movement between the core and its tightly fitted tubular cover would not be apt to occur even if the adhesive between the paper and the core were more or less ineffective.

In Fig. 3 are shown two strips of paper 21 wound spirally upon the core 20 to form a single layer. Obviously this layer could be formed of one strip or three strips with the pitch of the spiral regulated accordingly. In this Figure also there are shown two strips 22 making up the layer of felt, the felt strips being wound spirally in a direction opposite to the spiral of the strips 21 but at the same pitch, the edges of the strips in all cases being abutted closely. More than one layer of paper and more than one layer of felt may be employed if desired. The ends of the operative portions of the roll are finished with hardened steel bands or cups 23, those of one roll running upon those of the roll paired with it, whereby a limit of approach between the two rolls is provided. When the adhesive employed in attaching the cover material is hardened, the outer surface of the latter is accurately finished by grinding.

Fig. 4 served to illustrate the application of the roll of the present invention to a folding machine of the knife-fold type two such rolls being shown at 25. A sheet of paper in the process of being folded is shown at 26, and a knife 27 is shown in the act of forcing the paper at the line of the fold between the rolls 25, which are so driven as to feed the sheet downward between them as soon as the movement of the knife 27 has enabled the rolls to grip the paper.

In setting up and adjusting a folding machine embodying rolls constructed in accordance with this invention, the rolls of each pair are so adjusted as to cause the resilient felt covers to be slightly compressed along the line of engagement and for a short distance on either side thereof. These short, temporarily flattened surfaces, afford a good grip upon the paper sheet and impart a positive movement thereto. However the felt material backed by the unyielding core of the roll, is able to transmit enough pressure to effect a sharp smooth fold when a buckled sheet of paper is passed between the rolls.

It will be obvious to those skilled in the art that the invention herein described is concerned with the use for the manufacture of rolls in folding machines of fabrics the texture of which is not produced by weaving but is analogous to felt. Apart from felt any other suitable felted materials which do not readily disintegrate during rotation under radial pressure may be used.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A roll for use in paper folding machines, comprising an unyielding core and a strip of felted fabric wound spirally thereupon and secured thereto.

2. A roll for use in paper folding machines, comprising an unyielding core

member, a layer of fibrous material such as paper mounted on said core member, and an outer surface layer of felted fabric mounted upon said fibrous material.

3. A roll for use in paper folding machines, comprising a core, a strip of fibrous material such as paper wound spirally thereupon and secured thereto, and a strip of felted fabric wound spirally upon said fibrous material and secured thereto, said two strips being wound in opposite directions.

4. A roll for use in paper folding machines, comprising a core, a plurality of strips, one above another wound spirally upon said core, the strips of adjacent layers being wound in opposite directions, and the strip of the outer layer being felt.

5. A roll for use in paper folding machines, comprising a core, a plurality of strips one above another wound spirally upon said core, the strips of adjacent layers being wound in opposite directions, and the strips of adjacent layers being cemented together to form a composite tube possessing inherent strength and presenting a surface of felted fabric substantially as described.

6. Folding rolls for use in folding machines composed and produced substantially as described and illustrated.

Dated the 10th day of September, 1930.

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Fig. 1.

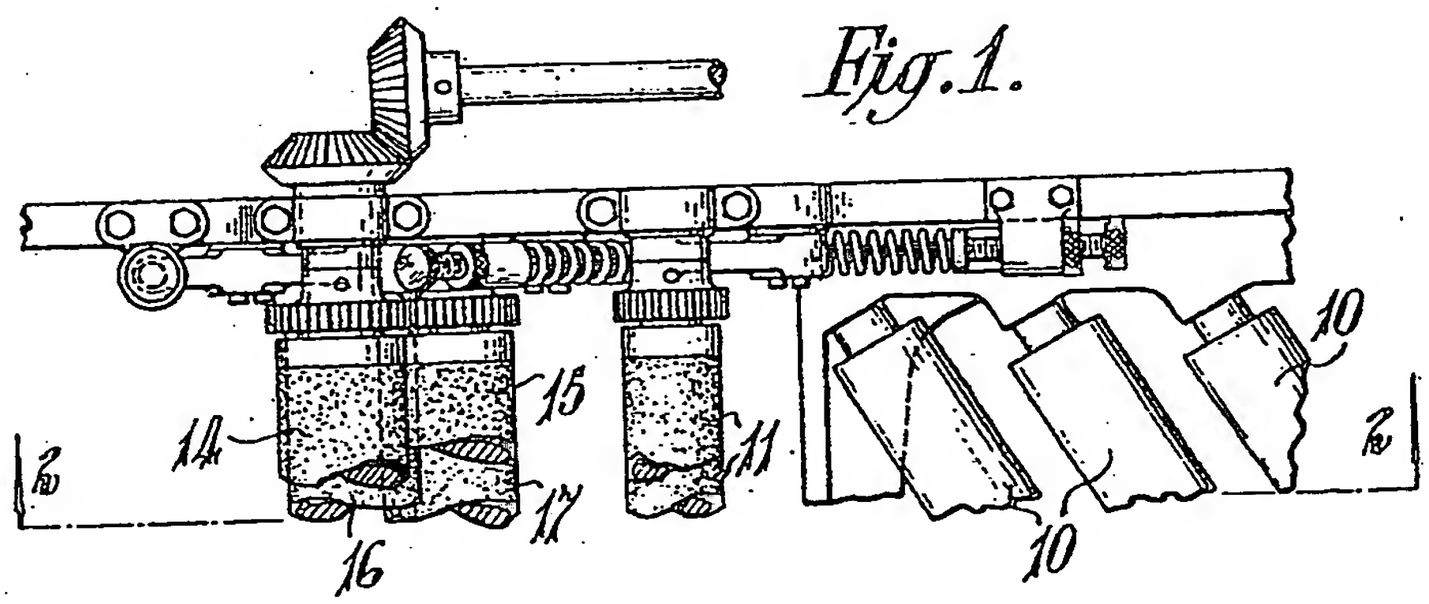

Fig. 2.

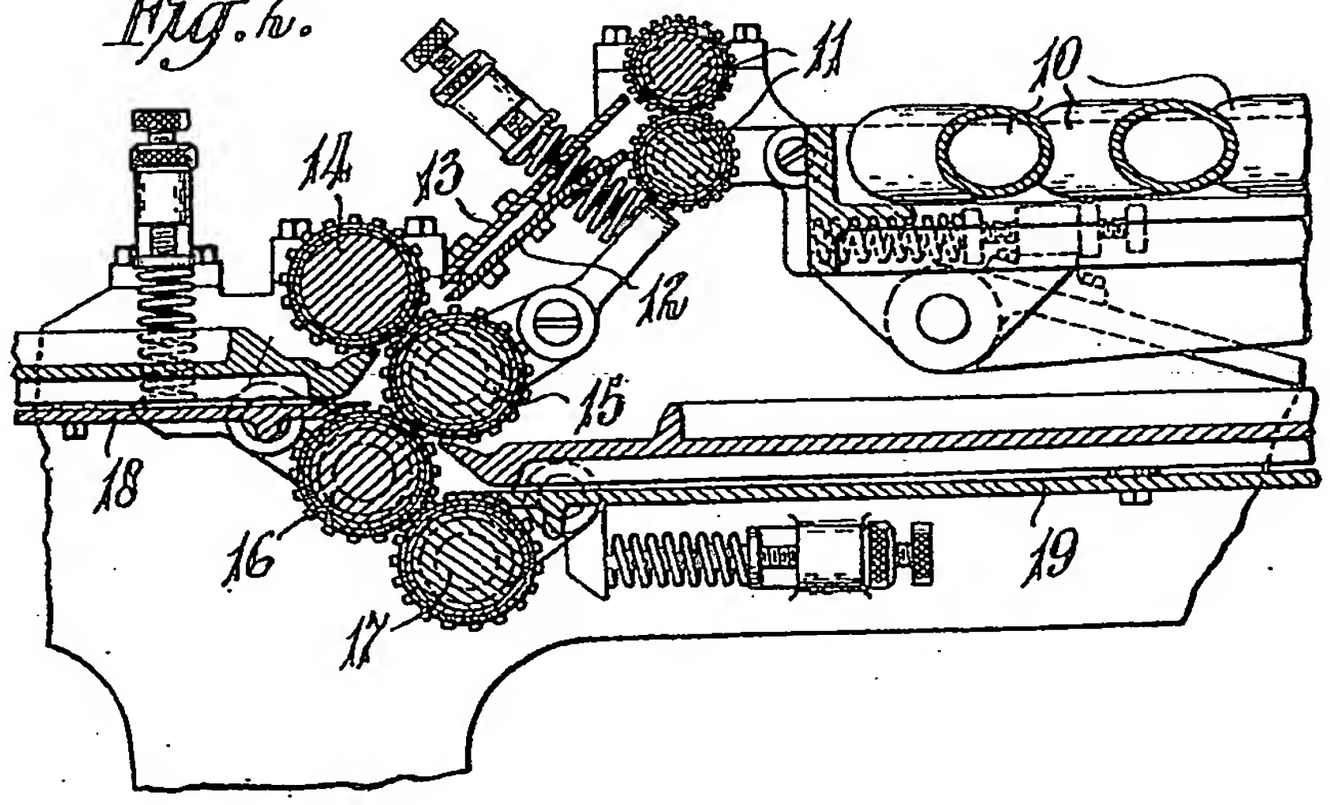

Fig. 3.

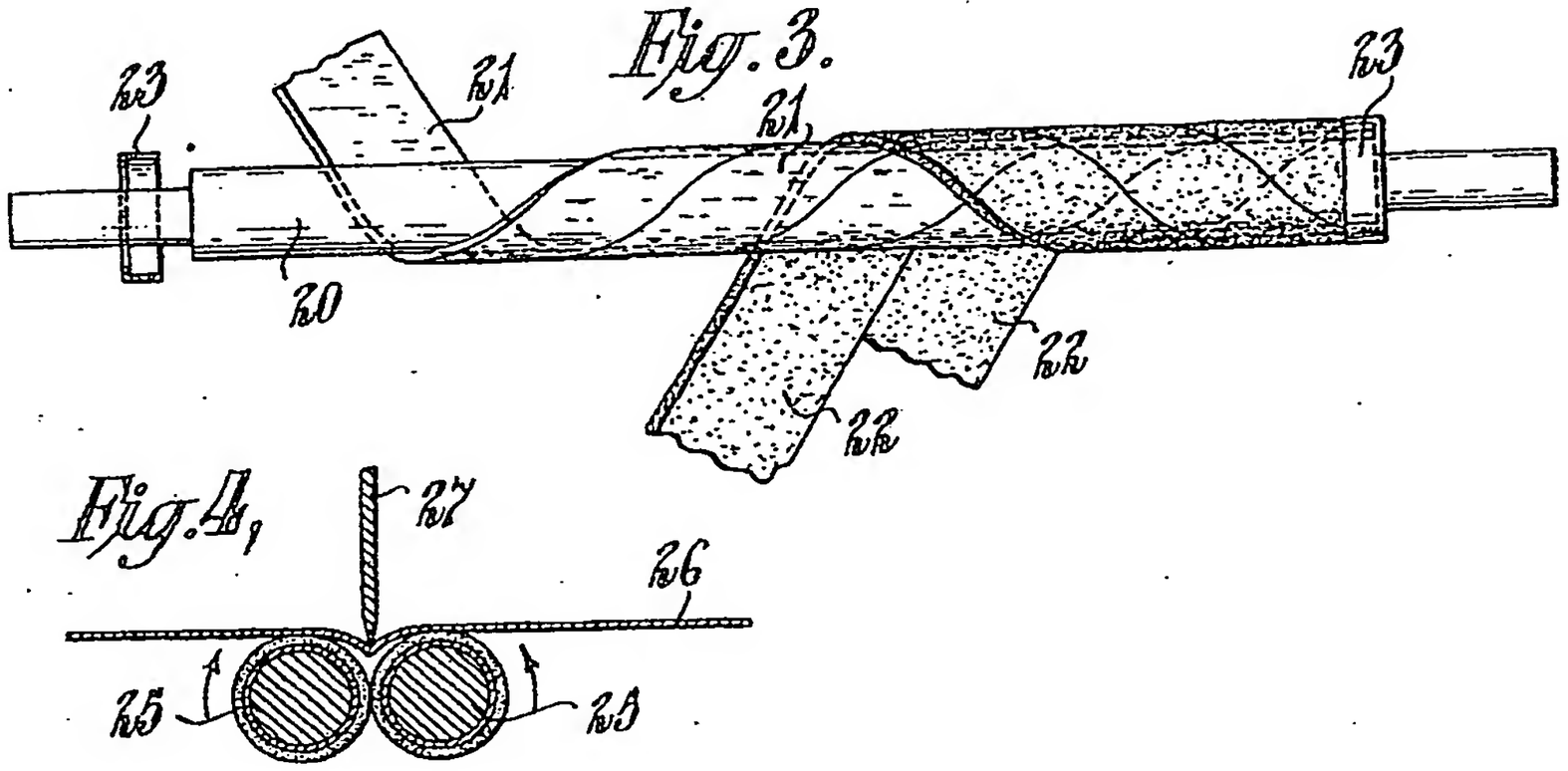

Fig. 4.

Charles & Read Ltd. Photo Litho.